

## 3.6 Factoring Trinomials by Decomposition.

### Example 1 Multiplying Two Binomials with Positive Terms

Expand:  $(3d + 4)(4d + 2)$



**SOLUTION**



CHECK YOUR UNDERSTANDING

## Factoring a Trinomial by Decomposition

Using example:

$$\begin{aligned} &\text{to multiply } (3h + 4)(2h + 1) \\ &= 3h(2h + 1) + 4(2h + 1) \\ &= 6h^2 + 3h + 8h + 4 \\ &= 6h^2 + 11h + 4 \end{aligned}$$

To factor  $6h^2 + 11h + 4$ , using decomposition, we reverse the steps from above.

Notice that:

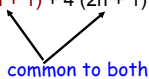
- the coefficients of the h-terms have the product:  $3(8) = 24$
- the product of the coefficient of the  $h^2$ -term and the constant term:  $6(4) = 24$

So, to factor  $6h^2 + 11h + 4$ , we decompose the h-term and write it as a sum of two terms whose coefficients have a product of 24.

Factors of 24	Sum of Factors
1, 24	25
2, 12	14
3, 8	11
4, 6	10

The two factors that have a sum of 11 are 3 and 8.

We remove a common factor from the 1st pair of terms, and from the 2nd pair of terms:

$$6h^2 + 3h + 8h + 4 = 3h(2h + 1) + 4(2h + 1)$$


common to both

So, this equals:  $(3h + 4)(2h + 1)$